CLAIMS

WHAT IS CLAIMED IS:

1.   A method for representing a given range of numbers with a plurality of entries, the method comprising:

determining whether one or more portions of the given range are representable as one or more entries that utilize wildcards;

representing the one or more portions of the given range with one or more entries having one or more wildcards when such one or more portions are representable as one or more entries that utilize wildcards; and

representing all numbers of a remaining one or more portions of the given range that are not representable as one or more entries that utilize wildcards as entries that do not utilize wildcards,

wherein the entries are optimized such that a minimum number of entries are used to represent the given range.

2.   A method as recited in claim 1, wherein each number within the given range represents a phone number.

3.   A method as recited in claim 1, wherein each number within the given range represents a router address.

4.   A method for representing a given range of numbers with an optimized set of entries utilizing wildcards, the given range having a beginning number and an ending number, the method comprising:

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dividing the given range into a first sub-range, a second sub-range, a third sub-range, and a fourth sub-range, the first sub-range having lower numbers than the second sub-range, which has lower numbers than the third sub-range, which has lower numbers than the fourth sub-range;

5   including all numbers within the first sub-range as entries within the optimized set; and

optimizing the second, third, and fourth sub-ranges into a plurality of entries using wildcards, the entries being included within the optimized set.

5.   A method as recited in claim 4 wherein the first sub-range includes a

10   first portion of the given range that cannot be represented with wildcards.

6.   A method as recited in claim 5 wherein the first sub-range includes the beginning number of the given range to, but not including, a first number of the given range that is divisible by 10.

7.   A method as recited in claim 6 wherein the first sub-range is empty

15   when the beginning number of the given range is divisible by 10.

8.   A method as recited in claim 5 wherein the second sub-range includes the first number of the given range that is divisible by 10 to, but not including, a number of the given range that is representable with an integer times a highest power of ten.

20   9.   A method as recited in claim 8 wherein the second sub-range is empty when the beginning number is the number of the given range that is representable with an integer times the highest power of ten.

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10.	A method as recited in claim 8 wherein the third sub-range includes the number of the given range that is representable with an integer times the highest power of ten to, but not including, a last number of the given range that is divisible by ten.

5	11.	A method as recited in claim 10 wherein the third sub-range is empty when the beginning number is the last number of the given range that is divisible by ten.

12.	A method as recited in claim 10 wherein the fourth sub-range of numbers includes the last number of the given range that is divisible by ten to the

10	ending number of the given range.

13.	A method as recited in claim 12 wherein optimization of the second sub-range is accomplished by:

dropping one or more zeros off the beginning number to form a counting value, wherein the number of dropped zeros equals a magnitude value;

15	determining place where beginning and ending numbers first differ going from left- to right-most digits;

truncating the ending number after the first differing digit to form a limiting value;

incrementing the counting value and then adding a wildcard entry equal to the

20	incremented counting value with addition of a number of wildcards equal to the magnitude value to the optimized set until the counting value equals the limiting value; and

when the counting value is divisible by 10, dropping one or more zeros off the counting value and incrementing the magnitude value by the number of dropped zeros.

14.   A method as recited in claim 13 wherein optimization of the second sub-range is performed prior to the optimization of the third sub-range, the optimization of the third sub-range being accomplished by:

dropping a number of zeros equal to the magnitude value off the beginning number to form a new counting value;

truncating the ending number by a number of digits equal to the magnitude to form a new limiting value;

adding a wildcard entry equal to the incremented counting value with addition of a number of wildcards equal to the magnitude value to the optimized set and then incrementing the counting value until the new counting value equals the new limiting value; and

when the new counting value equals the new limiting value and the magnitude value is not equal to 1, decrementing the magnitude value and appending a zero to the new counting value.

15.   A method as recited in claim 14 wherein optimization of the third sub-range is accomplished by:

adding a wild card entry equal to the beginning number truncated by a one's place digit with addition of a single wildcard character when the one's place of the beginning number equals 0 and a one's place of the ending number equals 9; and

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adding all numbers within the fourth sub-range to the optimized set when the one's place of the beginning number does not equal 0 or the one's place of the ending number does not equal 9.

16.   A method as recited in claim 4, wherein each number within the given

5   range represents a phone number.

17.   A method as recited in claim 4, wherein each number within the given range represents a router address.

18.   A router for representing a given range of numbers with a plurality of entries, the router comprising:

    a memory; and

10   a processor coupled to the memory,

    wherein at least one of the memory and the processor are adapted to provide:

    determining whether one or more portions of the given range are representable as one or more entries that utilize wildcards;

15   representing the one or more portions of the given range with one or more entries having one or more wildcards when such one or more portions are representable as one or more entries that utilize wildcards; and

    representing all numbers of a remaining one or more portions of the given range that are not representable as one or more entries that utilize

20   wildcards as entries that do not utilize wildcards,

    wherein the entries are optimized such that a minimum number of entries are used to represent the given range.

19.	A router as recited in claim 18, wherein each number within the given range represents a phone number that are associated with a same information.

20.	A router as recited in claim 19, wherein the same information is a customer identification.

21.	A router as recited in claim 18, wherein each number within the given range represents a router address that are associated with a same information.

22.	A router as recited in claim 21, wherein the same information is a destination address.

23.	A router for representing a given range of numbers with an optimized set of entries utilizing wildcards, the given range having a beginning number and an ending number, the router comprising:

a memory; and

a processor coupled to the memory,

wherein at least one of the memory and the processor are adapted to provide:

dividing the given range into a first sub-range, a second sub-range, a third sub-range, and a fourth sub-range, the first sub-range having lower numbers than the second sub-range, which has lower numbers than the third sub-range, which has lower numbers than the fourth sub-range;

including the numbers within the first sub-range as entries within the optimized set; and

optimizing the second, third, and fourth sub-ranges into a plurality of entries using wildcards, the entries being included within the optimized set.

24.   A router as recited in claim 23, wherein each number within the given range represents a phone number that are associated with a same information.

25.   A router as recited in claim 24, wherein the same information is a customer identification.

5   26.   A router as recited in claim 23, wherein each number within the given range represents a router address that are associated with a same information.

27.   A router as recited in claim 26, wherein the same information is a destination address.

28.   A computer readable medium containing programming instructions for 10   representing a given range of numbers with a plurality of entries, the computer readable medium comprising:

computer code for determining whether one or more portions of the given range are representable as one or more entries that utilize wildcards;

computer code for representing the one or more portions of the given range 15   with one or more entries having one or more wildcards when such one or more portions are representable as one or more entries that utilize wildcards; and

computer code for representing all numbers of a remaining one or more portions of the given range that are not representable as one or more entries that utilize wildcards as entries that do not utilize wildcards,

20   wherein the entries are optimized such that a minimum number of entries are used to represent the given range.

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29. A computer readable medium containing programming instructions for representing a given range of numbers with an optimized set of entries utilizing wildcards, the given range having a beginning number and an ending number, the computer readable medium comprising:

computer code for dividing the given range into a first sub-range, a second sub-range, a third sub-range, and a fourth sub-range, the first sub-range having lower numbers than the second sub-range, which has lower numbers than the third sub-range, which has lower numbers than the fourth sub-range;

computer code for including the numbers within the first sub-range as entries within the optimized set; and

computer code for optimizing the second, third, and fourth sub-ranges into a plurality of entries using wildcards, the entries being included within the optimized set.

30. A computer system for representing a given range of numbers with a plurality of entries, the computer system comprising:

a memory; and

a processor coupled to the memory,

wherein at least one of the memory and the processor are adapted to provide:

determining whether one or more portions of the given range are representable as one or more entries that utilize wildcards;

representing the one or more portions of the given range with one or more entries having one or more wildcards when such one or more portions are representable as one or more entries that utilize wildcards; and

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representing all numbers of a remaining one or more portions of the given range that are not representable as one or more entries that utilize wildcards as entries that do not utilize wildcards,

wherein the entries are optimized such that a minimum number of entries are used to represent the given range.

31.   A computer system as recited in claim 30, wherein the numbers within the given range are telephone numbers.

32.   A computer system for representing a given range of numbers with an optimized set of entries utilizing wildcards, the given range having a beginning number and an ending number, the computer system comprising:

a memory; and

a processor coupled to the memory,

wherein at least one of the memory and the processor are adapted to provide:

dividing the given range into a first sub-range, a second sub-range, a third sub-range, and a fourth sub-range, the first sub-range having lower numbers than the second sub-range, which has lower numbers than the third sub-range, which has lower numbers than the fourth sub-range;

including the numbers within the first sub-range as entries within the optimized set; and

optimizing the second, third, and fourth sub-ranges into a plurality of entries using wildcards, the entries being included within the optimized set.

33.   A computer system as recited in claim 32, wherein the numbers within the given range are telephone numbers.

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